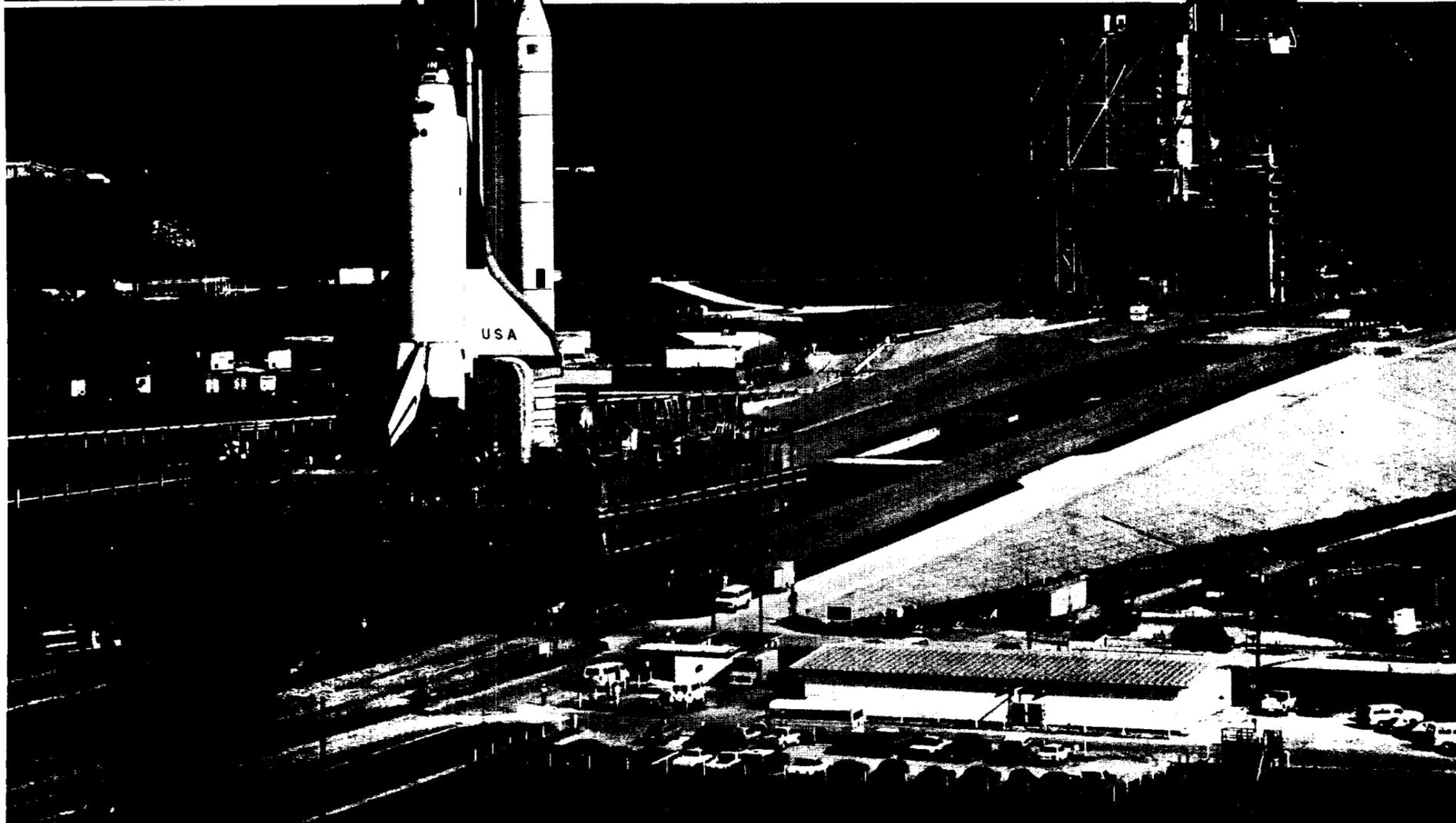


Space News Roundup

Vol. 21 No. 19

October 1, 1982



Columbia begins the roll up the ramp to Launch Pad 39A Sept. 21 following the 3.5 mile journey from the Vehicle Assembly Bldg. at the Kennedy Space Center. This week, the STS-5 crew participated in a countdown simulation, and four days later launch crews at

KSC conducted a trial loading of the external tank cryogenic fuels. Tests were also conducted at the Vertical Processing Facility in a series of procedures to prepare payloads for the upcoming flight, still on schedule for Nov. 11 launch.

Camera to give astronaut's view of EVA

A miniature television camera, its postage-stamp-size lens peeking over Astronaut Joseph Allen's helmet, will give viewers on earth a first-hand look at what astronauts see during a space walk on STS-5 in November.

The small 2.5-pound camera will be used during a 3.5-hour extravehicular activity (EVA) on a five-day flight of Columbia after two communications satellites have been deployed. Scheduled launch date of the STS-5 is Nov. 11.

During the space walk, mission specialists Allen and William B.

Lenoir will test onboard tools in the orbiter's payload bay while the camera relays the action to earth or into Columbia's cabin.

The mini-camera uses a solid state image sensor instead of a vacuum tube and is housed above the helmet's visor assembly. Solid state is less complex and lighter, requiring less power. The camera weighs half that of a similar vidicon tube unit, and transmits live black and white television scenes.

The lens has a 19.7 mm focal length with a 32-degree horizontal field-of-view and normal depth of

field from 32 inches to infinity. A close up lens adapter is snapped into position by the astronaut for focus from 12 to 32 inches.

Before leaving *Columbia*, Allen and Lenoir will don the Shuttle spacesuits and pre-breathe for about three and a half hours in the middeck airlock prior to exiting the Orbiter. This is being done to denitrogenize their bodies and prevent a spaceborne version of the bends.

Following the prebreathe, the airlock will be depressed to 5 psia. A spacesuit leak check will be conducted and then power will

be transferred from umbilicals to the spacesuit internal batteries. The spacesuits, known as EMU's (for extravehicular mobility units) have a capability for a seven-hour EVA. A minimum of 30 extra minutes is provided by the secondary oxygen pack (SOP) when in a purge mode. After the umbilicals are disconnected, the SOP's are brought on line and the airlock will be depressed to a vacuum. EMU systems checks will be performed and then Allen and Lenoir will float out for the first American spacewalk since 1975.

At this point, Allen will switch

on the camera and lights also mounted on his helmet. Views from this camera and four others in the payload bay, as well as an additional camera on the aft flight deck, will document the EVA. Live TV downlinks are currently scheduled during the 49th orbit through the Mila tracking station and on the 50th orbit through the Hawaii, Goldstone and Mila stations.

The miniature TV camera was developed for the Air Force by Fairchild Weston Systems Inc. of Syosset, NY and modified for Shuttle use.

Spacelab 1 payload specialists named

NASA and the European Space Agency (ESA) have named their prime and back-up payload specialists for the first Spacelab mission, SL-1, scheduled for launch on Sept. 30, 1983, on STS-9.

ESA has assigned Ulf Merbold, a German physicist, and NASA has assigned Byron K. Lichtenberg, a biomedical engineer, as onboard payload specialists. The second European, Wubbo J. Ockels, a Dutch physicist, and the second American, Michael Lampton, a physicist, will act as flight back-ups and will be deeply involved with the payload operations from the ground throughout the duration of the mission.

The Spacelab-1/STS-9 crew will thus consist of Merbold and Lichtenberg as payload specialists, Owen Garriott and Robert Parker as mission specialists, and John Young and Brewster Shaw, commander and pilot respectively.

Merbold and Lichtenberg will

perform experiments aboard the Spacelab using 38 different scientific packages both inside the habitable module and on the pallet. In this role, they will represent more than 70 different scientific investigators from Europe, Japan, and the United States.



Byron Lichtenberg

The Spacelab-1 mission ex-

periments were developed by scientific institutes in the ESA member states, Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom, and in Japan and the United States.

Since January 1982, the payload specialists have been undergoing mission operational training in the Payload Crew Training Facility at the NASA Marshall Space Flight Center, where they are faced with operational situations very similar to those they will encounter during the Spacelab-1 flight.

In December 1977, ESA selected Merbold, Ockels and Claude Nicollier, Switzerland, as payload specialist candidates from among some 2,000 European applicants. Since January 1978, they have been preparing for the Spacelab-1 mission. During their training, which has been carried out in Europe, Japan and in the United States, the payload

specialists have acquired an in-depth knowledge of the individual experiments comprising the first Spacelab payload and will thus be in a position to operate and monitor them closely and to execute



Ulf Merbold

minor repairs or adjustments which may be required during the flight.

During this period, Claude Nicollier was assigned to undertake mission specialist training and, as a result, was no longer considered a European payload specialist. He is now a candidate for a mission specialist position on the German Spacelab mission, D-1, scheduled for launch in mid-1985.

In May 1978, Michael Lampton, University of California at Berkeley, and Byron Lichtenberg, Massachusetts Institute of Technology, Cambridge, were selected by the Spacelab 1 Investigators Working Group (IWG), to be the American payload specialists.

Dr. Lichtenberg was born in Stroudsburg, PA in 1948. He received his bachelor of science degree in electrical engineering from Brown University in 1969. His graduate work was done at the Massachusetts Institute of Technology, where he received his master's in mechanical engineering in 1975 and his SC.D. in

(Continued on page 2)

Bulletin Board

AIAA to discuss OSTA-1 results

Richard R. Baldwin of the Spacelab Mission Management Office at JSC and Dr. JoBea Cimino of the Jet Propulsion Laboratory technical staff on Shuttle imaging radar will be on hand to discuss the flight results of the OSTA-1 payload during a meeting of the Houston section of the American Institute of Aeronautics and Astronautics Oct. 14 at the Gilruth Center. Flight summary results of the successful OSTA-1 payload flown during STS-2 will be reviewed with a detailed explanation of the Shuttle imaging radar flight results. Experiment planning for the OSTA-3 payload now scheduled for STS-17 will also be discussed. The social hour begins at 6 p.m., with baked ham dinner at 7 p.m. and the program at 8 p.m. Ticket price is \$8.50 for members and spouses, \$7.50 for non-members and students will get a \$2 discount. Dinner reservations are required by noon Oct. 12. For reservations, call Dianne at 333-4150; Joanne at 333-2030, x242; Patty at 488-5660, x211; Nancy at x3995 and Sylvia at 845-7541.

Alley Theatre subscriptions still available

Orders may still be placed for the Nina Vance Alley Theatre corporate subscription drive, but not much time remains. Season tickets are available for the coming year's series of six performances for a total of \$36. Brochure order forms are available in the Bldg. 11 Exchange Store and through your Employees Activities Association representative. Checks should be made payable to the Alley Theatre and will be cashed when the subscription program has ended. The season opens this month. Orders should be sent to Doris Wood, SN1, x4464.

LPI seminar schedule listed

The latest seminars in a series sponsored by the Lunar and Planetary Institute will include a discussion on lunar soil potentials for possible future lunar base applications. The seminars are held at 3:30 p.m. on Fridays in the Berkner Room at LPI. On Oct. 8, Quinn Passey of Exxon Production Research will discuss "Thermal and Viscosity Lithospheric Histories of Ganymede, Callisto and Enceladus." On Oct. 22 Bill Agosto of JSC will discuss "Lunar Soil Mineral Separates for Lunar Base Applications." On Nov. 5, Roberta Rudnick of Sul Ross State University and LPI will discuss "Geochemistry and Tectonic Affinities of a Precambrian Basalt-Rhyolite Suite, Van Horn, Texas."

Aerovan coming in October

NASA's new Aero van, a traveling exhibit which made its debut at the Oshkosh Fly-In in August, will be at JSC October 12 and 13, according to the Public Services Branch. The Aero Van is actually a 30-foot-long fifth wheel trailer loaded with a variety of exhibits depicting NASA's aeronautics research. It will be parked on the south side of the Visitor Center for those two days and will be open to the public. The exhibits include a working mini-wind tunnel, various models and explanations of how NASA research is contributing to aircraft efficiency, safety, passenger comfort, and the future directions of aircraft design.

Exchange Store has Festival tickets

The JSC Exchange Store has obtained tickets for the Texas Renaissance Festival to be held in Plantersville every weekend from Oct. 2 to Nov. 7 from 9 a.m. to sundown. Tickets are \$8 for adults and \$4 for children ages 5 to 12. The price includes entertainments plus all events at the New Market Race Track and Arena. Parking is free; foods, crafts and games are extra. Ticket sales end Oct. 27.

Gilruth Center News

Call x3594 for more information

Stained glass — It's not too late to sign up for this class, which begins Oct. 5 and runs for six weeks. Classes are held on Tuesdays from 7 to 9 p.m. and the cost is \$35 per person. Space is limited, first come, first served.

Garage sale — Come swap and shop with us at our annual garage sale. All types of homemade items will be on sale during the event, which takes place from 9 a.m. to 3 p.m. Oct. 16. A limited number of tables are available and reservations must be made by calling the Rec Center at x3594.

Auto mechanics — This class stresses the fundamentals of automobile repair. The course features lectures on three consecutive Thursdays from 7:30 to 9:30 p.m. beginning Sept. 30. One Saturday morning lab will also be held. The cost is \$17 per person.

Intercenter race — Once again, JSC employees will have the chance to compete against runners at other NASA centers in this October Intercenter Race. The JSC event begins at 9 a.m. Oct. 16. For more information, call the Rec Center at x3594.

Instructors needed — If you are proficient in teaching a leisure class which you think may be of interest to JSC employees, call Helen Munk at x3594 to discuss details.

JSC vs UH/CLC — Due to the success of our year-long sports competition with the University of Houston at Clear Lake City, we have expanded the program this year to also include Ellington Air Force Base. Sports under consideration include tennis, flag football, golf and racquetball. If you are interested in representing JSC in any of these sports, call Helen Munk at x3594.

Movies for adults — Due to the success of our children's movies, we have now expanded our programs to include movies for adults as well. Our schedule includes a social hour at 6 p.m., dinner at 7 p.m. and the movie at 8 p.m. The first presentation will be "Absence of Malice," starring Paul Newman and Sally Field. Tickets can be purchased for \$4 at the Bldg. 11 Exchange Store.

Roundup Swap Shop

Property & Rentals

For lease: Seabrook 3-2-2 in Seascape area, 2 yrs. old, microwave, \$575 plus deposit, avail. after Oct. 1. Call 334-1944.

For sale: University Trace 1-1 1/2 condo., townhome style, fpl., W/D, security alarm, ceiling fan, clubhouse. Call Rudy, 488-4595 after 5 p.m.

For sale: League City 3-2-2 and 3-1 1/2-2, freshly redecorated, will consider renting. Call 554-6200.

For sale, lease or lease to purchase: Heritage Park 3-2-2, fenced yard, \$550/mo. plus \$500 deposit. Call Quinn, x4671 or 481-0289.

For lease: Sunmeadow 3-2-2, split bedroom, fpl., fenced yard, near golf/tennis, \$685/mo. Call George, x3987 or 474-5267.

For sale: El Dorado Way, 1 BR condo, up, fpl., W/D, refrig., 2 patios, pool, tennis courts, sauna, \$38K. Call 480-2439.

For sale: 2-1-1 condo on Clear Lake, pools, saunas, lighted tennis courts. Call Joan, 488-6441.

Cars & Trucks

1931 Model A Ford rumble seat Coupe, restored, very good condition, asking \$8,000. Call Dick Paulson, 488-5660, x309 or 334-2293 evenings.

1977 Datsun 810 Sedan, excellent condition, auto, AC, PB, AM/FM/cassette. Call 921-2793.

1977 Accord, 5 spd., hatchback, AM/FM, AC (needs work), excellent economical transport, \$2,995. Call 488-1042.

1979 Trans Am, black/black velour, AM/FM/cassette, t-tops, new tires, loaded, excellent condition, \$6,375. Call Sheryl, x2031 or 331-7325 after 6 p.m.

1976 Cadillac Coupe de Ville, fair body condition and some mechanical problems, \$1,000. Call 486-7180 after 5 p.m.

1970 Plymouth Duster, needs body work. Call Welch, 474-2654 after 5 p.m.

1972 Chevelle Malibu, 350 auto, AM/FM/cassette, new tires, running condition, needs some work, must sell, best offer. Call Trixie, x3761.

1973 VW Bug, radials and good body, 30 MPG, AM/FM, dependable transport, \$1,700. Call Marty, x4663.

1977 Bonneville Brougham, loaded, excellent condition, \$2,400. Also, 1975 Mustang II, good condition, \$1,400. Must sell one or the other. Call 480-3111 after 5 p.m.

1978 Dodge Diplomat, 4 dr., auto, PS, PB, AC, 5' new tires, AM/FM/cassette, 52K miles, excellent condition, \$3,300 or best offer. Call 480-6815.

1980 Mercury Zephyr, 4 spd., 4 cyl., AC, AM/FM, cruise, 30K miles, below book at \$3,850. Call 474-3510 after 5:30 p.m.

1979 Corvette, loaded, navy/gray interior, excellent condition, \$10,000 firm. Call Meider, x4386.

1969 Rambler station wagon, auto, AC, needs work but good body and engine, \$100. Call 487-8633.

1978 Datsun 280Z 2+2, 5 spd., AC, AM/FM/cassette, wire wheels, looks and runs great. Call 471-1942 weekends.

1981 Subaru GL, 4 mo. old, 3,500 mi., AC, 5 spd., loaded, paid \$9,000, will sell for \$7,400 or best offer. Getting married, must sell. Call Jeannie, x2411 or 480-0856 evenings.

1977 Chevy Monte Carlo laundau, auto, AC, PS, PB, AM/FM/cassette, excellent condition. Call 334-2894.

1977 Pinto wagon, good condition, 47K miles, AC, AM. Call Dave Z., x3048 or 482-0651.

1981 Subaru 3 dr. hatchback, AC, AM/FM/cassette, 5 spd., high mpg, \$5,300. Call Pam, x5021.

Boats & Planes

Bonanza for rent to steady customer or sell part interest. Based at Houston Gulf. Call C. Lewis, 488-3265.

1973 Quachita 14-foot John boat, 20 hp Chrysler outboard, trailer, \$850. Call 331-0608 after 6 p.m.

Bonzar nautical marine radar, still in shipping boxes with 90 day guarantee, \$1,000. Call Waite, x4241 or 333-2442.

Cycles

Honda CB350, needs tune-up, \$295. Call Steve, x5111 or 554-2435 after 5 p.m.

1980 KZ650, 2,200 miles, excellent condition, many extras, must sell, \$1,500 or best offer. Call B.J., 333-8117 or 538-2181 after 5 p.m.

1973 Honda 350 twin, needs title and some work, \$150. Call 487-8633.

Ladies' 26" Sears bicycle, new and in perfect condition. Call 486-5116 after 5 p.m.

Computers

32K color computer, joy sticks, cassette, space game, almost new, cost \$760, sell for \$650. Call Jeri, x4661 or 472-7960 after 5:30 p.m.

TRS-8- pocket computer, cassette interface, minisette recorder, carrying case, latest catalog, price is \$290, sell for \$175. Call Fitts, x3421 or 488-1601.

Wanted

Roommate to share 3-2-2 house in Camino South, fpl., WD, study, fenced yard, close to JSC, \$250/mo. plus \$100 deposit, plus share of utilities. Call Brian, x5111.

Female to share 3 BR house in Alameda Mall/Beverly Hills area. Call Kathy, 944-7402.

Female housemate to share 3-2-2 in Middlebrook area, no children, pets, \$250/mo. plus half utilities. Call 488-7891 after 5 p.m.

Female to share large furnished bedroom w/same, in condo near El Lago, for Fall '82, all appliances, WD. Call Angie, x2581.

Want female to share 2 BR home

near Alameda Mall with mother-in-law, smoker. Call Gil, x3591 or Lydia, 481-1172 after 4:30 p.m.

Female roommate to share 3-2-2 house in Piper's Meadow, non smoker preferred, \$325/mo. plus \$100 deposit. Call Reg, x2970.

Want to join or form carpool from Southwest Houston to JSC, 7:30 to 4:30 shift. Call Chau Tu, 665-7628 after 6 p.m.

Want 4 X 5 enlarger, with or without lens. Call Terry White, 332-5177.

Want electric piano or synthesizer; also need bike rack and fenders for a 10-speed. Call Larry, x5435 or 480-7917.

Musicians needed for jazz combo, goal is professional club and recording jobs, must be ready to make commitment. Call 480-6365.

Want to buy little girl's 16" 2-wheel bicycle. Call Lyn Amann, x4415.

The Sagemont Eagle car pool is still looking for 1 person to join 4-person pool, leaves at 7:35 from Sagemont and returns about 5:30, loads of fun. Call L. Parker, x4241.

Household

Five-piece living room suite, \$175, will sell some pieces separate: double mattress, \$10. Call 332-2391 after 6 p.m.

Whirlpool washer and dryer, models LA5700XK and LE5700XK, never been used, with warranty, \$500. Call Bob Patlach, x2406 or 554-2250.

Hide-a-bed in good shape, brown with floral design, \$75. Call Joe DeAtkine, x2068 or 488-3866.

Chippendale bedroom suite, collector's item, ca. 1890, 7 pieces, \$1,500; pie safe, \$400; washer & dryer, \$400. Call 538-3112 after 3 p.m.

Hotpoint 4.4 cu. ft. upright freezer, 2 yrs. old, excellent condition, \$295; 5 hp. Craftsman heavy duty tiller with reverse, 1 yr. old, \$350. Call 482-8457 after 5 p.m.

Miscellaneous

Baby crib, solid oak, 36 years old, refinished, excellent condition, \$150. Call 487-8633.

Sears built-in dishwasher, \$40; floor polisher/scrubber, \$30. Call 482-7073. Uni-syn carburetor synchronizer tool. Call Dave, 486-0808.

Have plants, will trade house and yard plants for other types. Call 474-2247.

Heathkit AM/FM digital clock radio, clock and radio work, alarm doesn't, \$20. Call 332-8328 after 5 p.m.

Coin collection, mounted and framed, \$150. Call 482-7546.

Japanese swords, daggers, armor and etc. wanted by collector, will pay fair dollar value. Call Sloan, x6246 or 334-4857.

Winchester model 70 30.06, variable power scope, barrel and stock engraved, show piece. Call Waite, x4241 or 33-2442.

Cookin' in the Cafeteria

Week of October 4 - 8, 1982

Monday: Chicken & Rice Soup; Texas Hots & Beans, BBQ Ham Steak, Steak Parmesan, Beef & Macaroni (Special); Green Beans, Carrots, Au Gratin Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Tomato Soup; Potato Baked Chicken, BBQ Spare Ribs, Mexican Dinner (Special); Squash, Broccoli, Ranch Beans, Spanish Rice.

Wednesday: Seafood Gumbo; Liver & Onions, Baked Turbot, BBQ Ham Steak, Baked Meatloaf w/Creole Sauce (Special); Beets, Brussels Sprouts, Green Beans.

Thursday: Beef & Barley Soup; Chicken & Dumplings, Corned Beef

w/Cabbage, Smothered Steak w/Cornbread Dressing (Special); Spinach, Cabbage, Cauliflower au Gratin, Parsley Potatoes.

Friday: Seafood Gumbo; Pork Chop w/Yam Rosette, Creole Baked Cod, Tuna & Salmon Croquette (Special); Brussels Sprouts, Green Beans, Buttered Corn, Whipped Potatoes.

Week of October 11 - 15, 1982

Monday: Cream of Celery Soup; Braised Beef Ribs, Chicken a la King, Enchiladas w/Chili, Italian Cutlet (Special); Navy Beans, Brussels Sprouts, Whipped Potatoes. Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin. Selection of Salads, Sandwiches and Pies.

Tuesday: Beef & Barley Soup; Turkey & Dressing, Country Style Steak, Beef Ravioli, Stuffed Cabbage (Special); Corn Cobbette, Okra & Tomatoes, French Beans.

Wednesday: Seafood Gumbo; Catfish w/Hush Puppies, Roast Pork w/Dressing, Chinese Pepper Steak (Special); Broccoli, Macaroni & Cheese, Stewed Tomatoes.

Thursday: Cream of Tomato Soup; Beef Tacos, BBQ Ham Slice, Hungarian Goulash, Chicken Fried Steak (Special); Spinach, Pinto Beans, Beets.

Friday: Seafood Gumbo; Liver & Onions, Deviled Crabs, Roast Beef w/Dressing, Tuna & Noodle Casserole (Special); Whipped Potatoes, Peas, Cauliflower.

Spacelab

(Continued from page 1)

biomedical engineering in 1979.

His primary area of research is biomedical engineering, and he was a primary member of a research staff which was involved in a Spacelab experiment when he was chosen to participate as payload specialist in 1978. Between 1969 and 1973 he served in the U.S. Air Force and received two Distinguished Flying Crosses during his tour of duty in Vietnam.

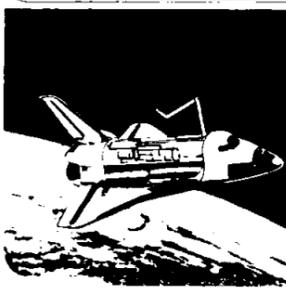
He is married and has two children.

Dr. Merbold was born in Greiz, Germany in 1941. He attended Stuttgart University where he graduated in 1968 and received a doctorate in science in 1978. He joined the Max-Planck Gesellschaft at Stuttgart first on a scholarship in 1968 and later as a staff member. He worked as a solid-state physicist on a

research team of the Max-Planck Institute for Metals Research. His main fields of work were in crystal lattice defects and low-temperature physics. He was also involved in the investigation of the irradiation damage on iron and vanadium produced by fast neutrons. In 1978 he was selected by ESA as one of the two European payload specialists for the first Spacelab mission. He is married and has two children.

NASA
Lyndon B. Johnson Space Center

Space News Roundup



The **Roundup** is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every other Friday by the Public Affairs Office for all space center employees. **Roundup** deadline is the first Wednesday after publication.

Editor

Brian Welch

Interview

Robert Crippen

Two years after STS-1, 'Crip' gets ready to go up again

"If Hollywood was casting the *Columbia* crew," the New York Times observed during STS-1, "it would surely pick Capt. Robert Laurel Crippen of the Navy."

The Times went on to state that "behind that movie star exterior is a brilliant intelligence and a wealth of knowledge about the Shuttle that could make him, if he so chooses and is lucky, as premier an astronaut in the second phase of manned American space flight as John Young was in the first phase."

It is doubtless a mistake to refer to anything John Young does as being in the past tense, but that's beside the point. Having those kinds of descriptions injected into the popular folklore is a part of the job perhaps, a liability of the astronaut business, and both men are bound to be resigned to it by now. To paraphrase Mae West, luck has nothing to do with it.

Crippen refers to the "basic skills" of flight, and it is hard to exaggerate the importance of those two words. Like all astronauts, his skills go back a long way and have little to do with how Hollywood might judge him. In 1960 he graduated from the University of Texas with a degree in aerospace engineering, and went on to earn a commission with the Navy and to serve for two years as a pilot aboard the U.S.S. *Independence*. After that, he was first a student and then a teacher at the Air Force's Aerospace Research Pilot School at Edwards Air Force Base. In 1966 he joined the Manned Orbiting Laboratory program as an astronaut, later joining NASA in 1969 when that program was canceled.

During the 1970s he was involved in intense work with the Skylab program and then with the Space Shuttle. In the spring of 1981 he finally got his first trip into space aboard STS-1.

He is now in training as commander for STS-7, scheduled for the spring of next year, along with three other astronauts, pilot Frederick Hauck, and mission specialists Sally Ride and John Fabian. Payloads for STS-7 will include two satellites, TELESAT-F and PALAPA B-1 and German shuttle pallet satellite known as SPAS.

We caught up with Crippen recently in his Bldg. 4 office where he took time out to answer a few questions:

Roundup: You've flown aboard *Columbia* and now you are preparing to fly *Challenger*. What, if anything, will be different about this new Orbiter?

Crippen: Well, there are significant changes in the *Challenger*, as there will be in *Columbia* when they take it back and do some rework on it. We elected to go ahead and fly *Columbia* knowing there were some system modifications we've gotten a little bit smarter about, and we just decided we'd put that work in downstream. We'll improve the redundancy of the vehicle in several different areas, and in *Challenger* of course the ejection seats won't be in. So that changes the aspect of not having to wear the pressure suits. It will be a little bit more comfortable as far as launch and entry is concerned. There is also the added element that if you really do get in a severe problem, there is no way to get out of the vehicle, so you've either got to ditch it or try and crash land it someplace. We really don't think those kind of contingencies are likely, but you do have to think about them and train for them. *Challenger's* interior has also had the DFI — the Develop-



From MOL to Low Earth orbit: Crippen as a Navy lieutenant commander assigned to the Manned Orbiting Laboratory program, left; in his official portrait for STS-1, center; and revelling in micro gravity aboard Columbia during his first space flight in April 1981.

mental Flight Instrumentation — removed. That took up a significant area of the middeck. Also, back on my flight, we had a couple of extra water tanks located in the middeck which took up some space, and all of that has been removed. So in effect we have opened up the cabin volume a considerable amount.

Roundup: Will you have bunks and a galley for STS-7?

Crippen: We have the capability of putting in bunks, but right now those are not scheduled to be flown except on Spacelab flights, where they are planning on working around the clock and you need a place to sort of isolate yourself from the rest of the stuff that's going on. Also the galley is not currently scheduled to be flown except on Spacelab flights. We're still using a system similar to what we used on the first flight, where you have a food heater, about the size of a little briefcase, which you put your food in. Besides that, we'll have some extra storage space. Up front, there will be a heads up display. I don't know if you are familiar with that term, but it's a device mounted in front of the commander and the pilot that presents information such that they can look through it out into the world during a landing and get such information as airspeed, altitude and some other things a bit more sophisticated than that presented against the background of what you're seeing. It keeps you from having to go back and forth in the cockpit to pick that information up off the instruments. Those have been found to be a great help in many different kinds of airplanes today and we've added it on thinking it will probably reduce the complexity of the landing task quite a bit by being right up there in front of you.

Roundup: With the HUD, will you basically be able to just concentrate on what's going on outside or is that what the pilot will be doing?

Crippen: When we roll out on final, I will be the one looking outside. The landing task is really the commander's. We confuse people with the terms commander and pilot; it's really more like pilot and copilot in most people's terms. But Rick will also be backing me up in that function and double checking stuff to make sure we are agreeing.

Roundup: What about your landing pattern? Will it be the same? Will the lift over drag coefficient and other such capabilities be different?

Crippen: All of that should be exactly the same. The vehicle itself is lighter, but it has increased structural capability, and is able to take a harder landing and tighter turns. Both vehicles have

basically the same cross range as well.

Roundup: Which do you consider more challenging — landing a fighter on the pitching deck of a carrier, or landing an Orbiter?

Crippen: Those are different kinds of tasks. From a piloting standpoint, I think the flying of the Shuttle is certainly something which takes a lot of time to learn. Once you've learned it, and you don't add in a lot of other stressful things like a bunch of turbulence, big strong crosswinds or something of that nature, it really doesn't seem all that complex. Coming aboard a carrier at night, once you've developed a set of basic skills and learn how to utilize them, is also not all that difficult, but certainly the scare factor is up a lot higher. Now if you put the Shuttle down at night, which Flight 8 is scheduled to do right now with Dick Truly, that may up the scare factor a little bit. It's hard to say. Different vehicles have different tasks, and both require skills and a lot of practice.

Roundup: STS-7 has a preliminary activity plan which makes for very interesting reading. Could you sort of walk us through the major events of that flight?

Crippen: Well, the satellite deploys are going to be almost exact duplicates of STS-5. There's a young man by the name of Bill Holmberg who is doing all our flight planning for us and he's been working on it very diligently for the past few months and has done an excellent job. Every time he thinks he's got it stabilized, somebody does something to perturbate it. But the current planning has us going up and doing a deploy on the first day, just like STS-5. We do the second deploy on the morning of the second day. There is some consideration being given to seeing if we can get rid of first day deploys, to give people a chance to adapt to zero-g in case some do feel a little queasy. At any rate, we will follow that up with some attached operations with the SPAS payload, which has several experiments mounted on it in such things as materials processing. We spend basically a day doing those experiments in the payload bay. Then we have another full day devoted to detached SPAS operations, where we take it and use the RMS to deploy the SPAS, back off from it, and hit it with some jets to find out what the plume of the Orbiter does to it.

Roundup: Let me get this straight. You're going to grapple the SPAS, release it in space, fire some of the *Challenger's* thrusters in its general direction, and then go and pick it up?

Crippen: Yes. We're going to turn loose of it, which is the first time

that will have been done with the Shuttle. We'll be flying the vehicle with respect to the payload to a few different places, hitting it with the plume. We can also control the SPAS remotely and move it to different attitudes, and then fly the Orbiter around it, sitting out around 200 feet, getting ourselves in position to grapple/again. Then we're going to back off from it, move out about a thousand feet in front of it and sit there for awhile station keeping. Then we'll make another approach to it, move in, make another grapple and put it away. Both John and Sally will be using the arm. That should be a fun day. We're really looking forward to that. And Sally will be doing some CFES (Continuous Flow Electrophoresis System) stuff and there are some OSTA operations also. The day before entry is very relaxed. Some of the things we'll be doing will be designed to try and help the turnaround operation for when *Challenger* is back on the ground. There are certain systems where we'll go through and check out those kinds of things which are hard to check on the ground. Like the flash evap. If we check that in orbit, you don't have to do it on the ground.

Roundup: Let's change the subject just a bit. In talking about astronaut turn around for Shuttle flights, one wonders exactly how to describe it. Does it consist of two weeks of jubilation, one week of debriefing, one day of rest and several months of training for the next flight?

Crippen: Well, we're still finding out what that is. As the flight rate continues to increase, hopefully the turnaround time will end up being shorter. It's going to be something like two years in my case. It's not obvious to us right off the top just how much time should be given to that interim period.

Roundup: Are there any biomedical considerations in determining how long that interim between flights should be?

Crippen: No. It's who can do it when, who's available, how much additional training if any is required. If I come back to fly another deploy mission, and we'll be doing quite a few of them, I would imagine from my standpoint there would be very little difference. If I wasn't out of the training flow that long, it wouldn't take very long to get ready to go again.

Roundup: Is it part of NASA's philosophy that time between flights should be as relatively short as possible, and secondly, would you think certain astronauts will come to specialize in certain types of flight?

Crippen: Both of those are

possibilities. We haven't figured it all out. From my own standpoint, I think somewhere around six months would be a nice turn around time, and you might be able to get it less than that. Training for one of these flights is a pretty involved and demanding type of process. I'm not sure you would want to put somebody in that kind of demanding environment and work them at that pace for a long time. You should certainly have a little vacation time, and certainly take advantage of some of the things you've learned and maybe feed them back into the training process. So I don't know exactly what the best time period is, but certainly two years is too long, I'll tell you that. One thing that is important I feel is that crews need some time working together as a unit. So part of the process of bringing back a crew would be to have more time if your plan is to change who sits in the opposite seat. And there are lots of demands on lots of individuals and we'll have to get educated on just how to work those out. I think it is quite possible that there will be general groups which tend to do deploy missions, others who do Spacelab and that kind of thing. Although at this particular stage, we don't think it is the right thing to do to go and start developing those groups. It's too early in the program.

Roundup: Is it just now starting to sink in, do you think, that the orbital flight testing is over, and all of a sudden here we are on the threshold of a really prodigious flight rate over the next few years?

Crippen: I think it's going to be coming up on a lot of people pretty soon. The bow wave is about to hit us. Dick Truly and I were doing some planning for the Astronaut Office on how, from an organizational standpoint, we're going to support this flight rate. And it becomes very apparent that we can't do many of the things the office has done in the past in supporting other facilities. Sometime toward the end of next year, we're going to have something like 40 people actively training for flights. And considering you always have to carry some overhead for other things, that's really going to tie a lot of people up.

Roundup: Not to put you in the position of having to say, 'Yes, I'd like to fly 47 more times in my career,' but do you think there is a magic number of flights that an average pilot can expect to make over the course of a career? Is 20 too much?

Crippen: I have no idea. Different individuals will be able to handle different amounts of flying. Twenty is an awful lot of flights. If you could turn around every six months, that would be about 10 years of flying, roughly. That could be a lot. We might be able to reduce that to every three months. That will probably be the key element, is how long does it take to turn around? But I'll tell you, that was so much fun on the first one, I'll stick around until they tell me I can't do it anymore.

Roundup: What kinds of things, from an astronaut's point of view, would be nice or necessary in a space station? Beige walls? Carpets? Big picture windows?

Crippen: (Laughs) Oh no. As far as I'm concerned, anyone who has lived aboard a United States Navy ship does not need all that much sophistication. If you are taking a couple of years to Mars, you might try to fancy it up a bit. But all those

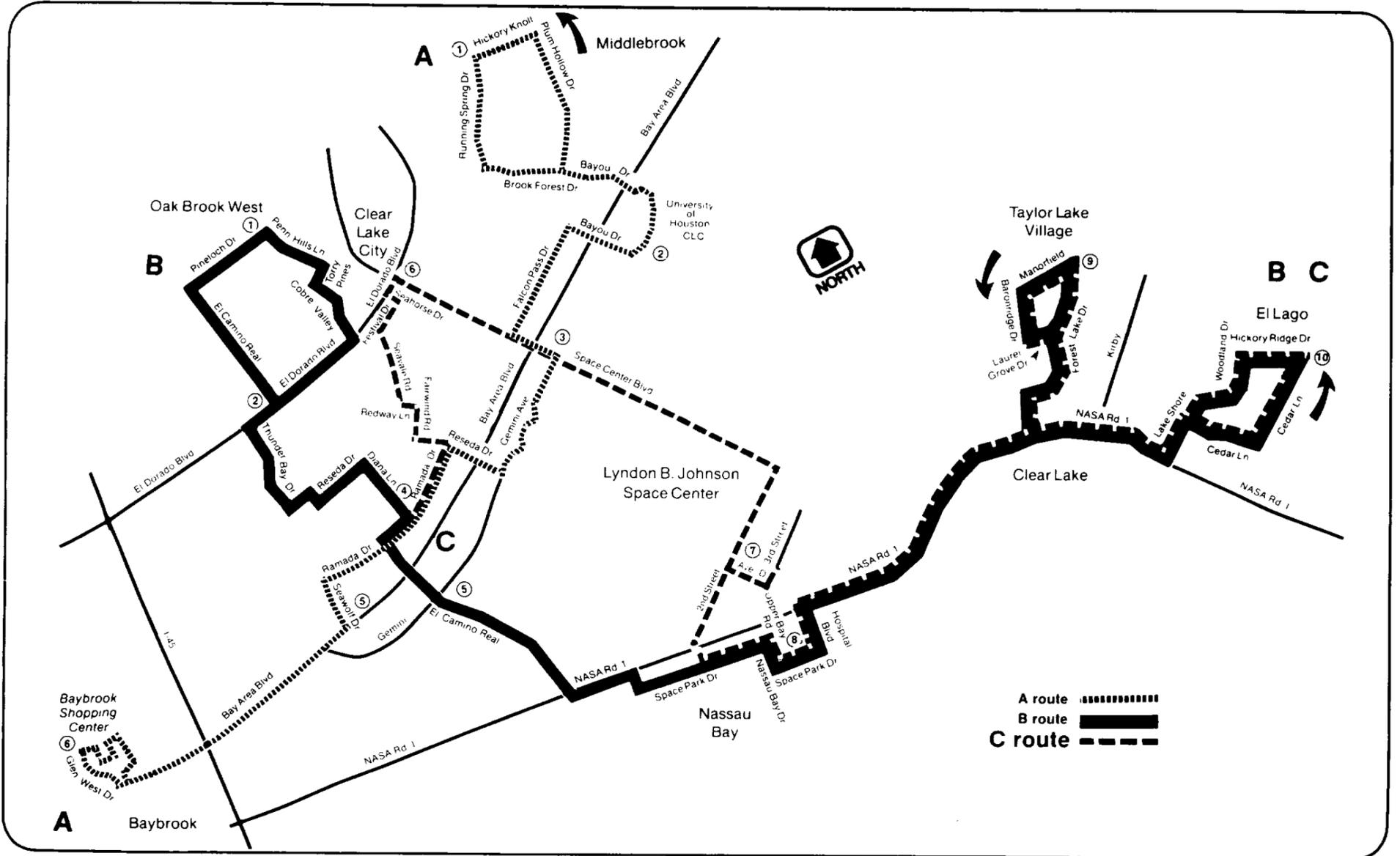
(Continued on page 4)

New bus route to JSC announced

The Clear Lake Shuttle now serves the Johnson Space Center, Monday - Friday. Route C, Johnson Space Center - El Lago, offers service from El Lago, Taylor Lake Village and NASA Road 1 to the Johnson Space Center. Also Route C connects with the Harris County Courthouse Clear Lake Annex at Diana and Ramada to provide transfer capability to and from Routes A and B.

The new Route C operates eastbound and westbound simultaneously to provide criss-crossing service on the route. To board the van, hail the vehicle at any corner along the route.

Fares on Route C are the same as on Routes A and B. All one-way fares are 40¢, exact change, or a monthly pass for unlimited rides during the calendar month, \$17.00. Orange CommuterCards accepted on the 142-Clear Lake City Express are also valid on the shuttle for unlimited rides during the calendar month. Children under five years of age when accompanied by an adult ride free. Children five to eleven years of age ride for 10¢. Transfers are available for patrons transferring between shuttle routes. Passes and CommuterCards are sold at Sears in Baybrook Mall and at Kroger stores on El Dorado and NASA Road 1. For more information, call METRO at 635-4000.



Weekday

B - Oak Brook

C - JSC-El Lago

EASTBOUND						WESTBOUND												
1	2	4	4	5	6	7	8	10	10	9	8	7	6	5	4	4	2	1
PINELOCK & PENN HILLS	EL DORADO & EL CAMINO	COURTHOUSE (DIANA & RAMADA) ARRIVING	COURTHOUSE (DIANA & RAMADA) LEAVING	GEMINI & EL CAMINO REAL	EL DORADO & SPACE CENTER	JSC BLDG #1 (AV. D & THIRD)	SPACE PARK & UPPER BAY	CEGAR & HICKORY RIDGE	CEGAR & HICKORY RIDGE	MANORFIELD & FOREST LAKE	SPACE PARK & UPPER BAY	JSC BLDG #1 (AV. D & THIRD)	EL DORADO & SPACE CENTER	GEMINI & EL CAMINO REAL	COURTHOUSE (DIANA & RAMADA) ARRIVING	COURTHOUSE (DIANA & RAMADA) LEAVING	EL DORADO & EL CAMINO	PINELOCK & PENN HILLS
5:57am	6:02am	6:08am	6:10	6:12	6:46am	6:56am	7:00	7:10	5:41am	5:52am	6:01am	6:08am	6:10am	6:15	6:21	6:26	6:26	6:26
6:26	6:31	6:38	6:40*	6:42	7:16	7:26	7:30	7:40	6:11	6:22	6:31	6:38	6:40	6:45	6:51	6:56	6:56	6:56
7:56	7:01	7:08	7:10	7:12	7:46	7:56	8:00	8:10	6:30	6:41	6:50	7:38	*7:10	7:15	7:21	7:26	7:26	7:26
8:26	8:31	8:38	8:40*	8:42	8:45	8:55	8:59	9:08	7:11	7:22	7:31	8:38	*8:10	8:15	8:21	8:26	8:26	8:26
8:56	9:00	9:07	9:10	9:12	9:45	9:55	9:59	10:08	8:26	8:41	8:50	9:33	*9:10	9:15	9:21	9:26	9:26	9:26
9:26	9:30	9:37	9:40*	9:42	9:45	9:55	9:59	10:08	9:26	9:37	9:46	9:33	*10:05	10:10	10:16	10:21	10:21	10:21
9:51	9:55	10:02	10:10	10:12	10:45	10:55	10:59	11:08	10:08	10:18	10:27	10:33	*10:35	10:40	10:46	10:51	10:51	10:51
10:21	10:25	10:32	10:40*	10:42	10:45	10:55	10:59	11:08	10:27	10:37	10:46	10:51	*11:05	11:10	11:16	11:21	11:21	11:21
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12:21pm	12:25pm	12:32	12:40*	12:42	12:45pm	12:55pm	12:59	1:08	12:27pm	12:37pm	12:46pm	12:51	*1:05	1:10	1:16	1:21	1:21	1:21
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1:21	1:25	1:32	1:40*	1:42	1:45	1:55	1:59	2:08	1:27	1:37	1:46	1:51	*2:05	2:10	2:16	2:21	2:21	2:21
1:51	1:55	2:02	2:10	2:12	2:50	3:00	3:04	3:13	2:08	2:18	2:27	2:33	*2:35	2:40	2:46	2:51	2:51	2:51
2:21	2:25	2:32	2:40*	2:42	2:50	3:00	3:04	3:13	2:27	2:37	2:46	2:51	*3:05	3:10	3:16	3:21	3:21	3:21
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7:01	7:05	7:12	7:15	7:17	7:21	7:31	7:35	7:45	7:07	7:17	7:26	7:32	*7:34	7:39	7:45	7:50	7:50	7:50

Route C timepoints

No service operated on Saturdays, Sundays or Holidays on Route C.

METRO

Crippen

(Continued from page 3)

things are not that important in a space station. Now, you do want to be comfortable. You would like to have relaxation, maybe with video tapes and that kind of thing. And a big window helps out an awful lot. You can really take yourself a long way with one of those. And the main thing is plenty of work. You've got to have some-

thing to keep yourself occupied. **Roundup:** One last question. You've been through the Shuttle cycle now, you've been intimately involved in the program for years, you've been all over the country and all over the world. You've probably seen a number of technology-related facilities like JSC. Where does this center stack up?

Crippen: JSC and the people here are unique. They really are. There probably is not another group like this in the entire world. If there is, I haven't come across it yet. And I'm not really sure what makes it, whether it's the people or the chance to work on what they are doing. But this place has more people really interested and who really enjoy the job than, in my

opinion, you will find anywhere else in the world. If you go ask the people here if they really enjoy their work, the majority of the answers will be yes, and I think that makes a difference in the product you get. One of the things which really impressed me about this place when I first showed up was how much the people work when they are not getting paid for

it. They are here working at all hours. It's their job and they want to get it done and get it done right. There's an awful lot of folks on this center who work all kinds of hours. Now, I've seen the same thing at Marshall and Kennedy and other NASA centers, but maybe it's because I work here, that it's obvious to me this is a special kind of place.